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NOTES ON GEOGRAPHIC DISTRIBUTION

Gastropoda, Caenogastropoda, Eulimidae, *Annulobalcis aurisflamma* Simone and Martins, 1995: First record to northeastern Brazil

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ABSTRACT: The current article provides the first record of *Annulobalcis aurisflamma* Simone and Martins, 1995 outside São Paulo state, Brazil. Herein we extend its geographical distribution to northeastern Brazil.

The biodiversity of marine invertebrates in Brazil is undoubtedly underestimated and the amount of new species being described is continuously increasing with their distributional records being constantly updated. Even in a well established group as Mollusca in which the shell facilitates its preservation, the most relevant book to the knowledge of Brazilian mollusks (Rios 1994; 2009) quickly becomes out of date due to the publication of many new descriptions and records of distribution (*e.g.* Absalão 2009; Simone 2009; Wiggers and Veitenheimer-Mendes 2009; Breves-Ramos *et al*. 2010; Caetano *et al*. 2010; Dacosta *et al*. 2010; Lima *et al*. 2010; Oliveira and Absalão 2010; Pimpão *et al*. 2010).

Among the gastropods, the family Eulimidae Philippi, 1853 is known as a symbiont of echinoderms (Barel and Kramers 1977; Warén 1983). Currently all Echinodermata classes have been recorded in association with these snails (Bacci 1948; Waren and Sibuet 1981; Cantera and Neira 1987; Waren and Crossland 1991; Lyskin and Britayev 2005; Crandall *et al*. 2008). A large spectrum of symbiosis has been registered among these two taxa, ranging from complex levels of endoparasitism (Altnöder *et al*. 2007) to relatively simple ectoparasites (Dgebuadze and Kantor 2009). Within the eulimids ectoparasites two different behaviors can be observed. The development of a specialized proboscis to feed on dermal tissues and body fluids leading to a permanent attachment to the host, and the mobile species that can move freely over the host while feeding on it (Vaïtilingon 2004) as in *Annulobalcis* Habe, 1965.

According to Warén (1983) *Annulobalcis* is characterized by relatively large species, showing a wide shell aperture, outer lip strongly projected and highly colored mantle. The genus is composed of three species recorded from the Pacific Ocean, *A. shimazui* Habe, 1965; *A. yamamotoi* Habe, 1974 e *A. marshalli* Warén, 1981, and two Atlantic species, *A. procera* Simone, 2002 and *A. aurisflamma* Simone and Martins, 1995 (Warén 1981; Warén 1983; Simone and Martins 1995; Simone 2002).

The aim of this paper is to report for the first time the occurrence of *Annulobalcis aurisflamma* out of São Paulo State coast, expanding its distribution up to northeastern Brazil.

The sample was gathered on January 6th, 2010 in Barra beach (Figure 1) Salvador-BA, Brazil (13°00'37" S, 38°31'49" W) at a depth of three meters in large natural reef pools. Altogether 32 crinoids of the species *Tropiometra carinata carinata* (Lamark, 1816) were observed and only five of them were parasitized. Eleven specimens of *A. aurisflamma* were collected from these five specimens of *Tropiometra carinata carinata.* Two specimens of *A. aurisflamma* were deposited in the Mollusca Collection of the Museu de Zoologia da Universidade de São Paulo (MZUSP 98545) and two in the Malacological Collection of the Instituto de Biologia da Universidade Federal do Janeiro (IBUFRJ 19082 and IBUFRJ 19083).

Annulobalcis aurisflamma species (Figure 2 A-C) shows all characteristics provided in the original description (Simone and Martins 1995). The host species, *Tropiometra carinata carinata* (Figure 2 G-D), is identified due to its small size. It bears ten arms emerging from five radial

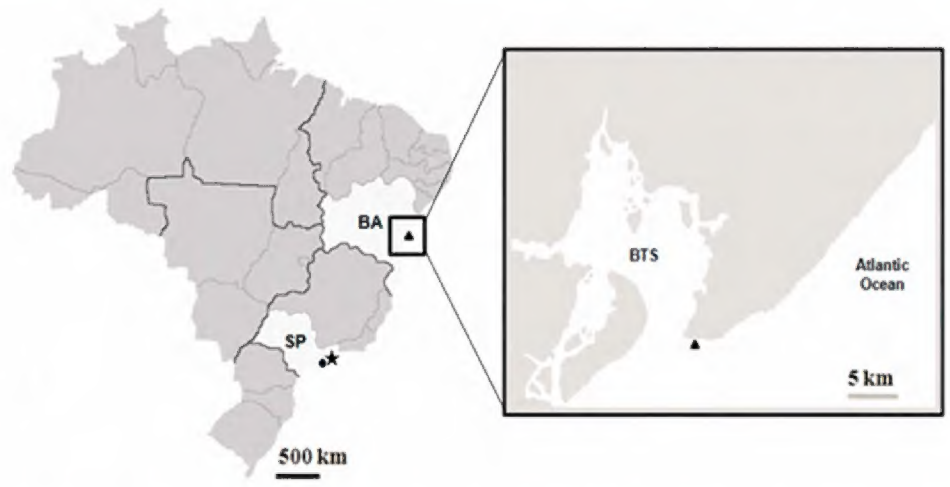

FIGURE 1. Geographical distribution of *Annulobalcis aurisflamma*. Star = type locality (Ubatuba) reported by Simone and Martins (1995); circle = second record (São Sebastião channel) reported by L.F. Netto (*unpublished dissertation*); triangle = present record. Locality abreviations: BA – Bahia State; SP – São Paulo State; BTS – Todos os Santos Bay.

stalks and ending abruptly (Figure 2D). Pinnules arranged in two rows and continuously exposed (Figure 2E). Anus laterally displaced and mouth in the center of calyx which bears an average of 21 cirrus (Figures 2D and 2F). Color variable, ranging from reddish brown with reddish and yellowish bands up to completely yellowish (Clark 1947).

Field observations registered the snails only on the aboral region of the arms, close to the calix (Figure 3). Further observations during sample procedures confirmed statement made by Simone and Martins (1995) that *A. aurisflamma* is able to easily release from its host probably due to the slightest indication of stress.

It can be inferred that *Annulobalcis* is specifically a crinoid associate except for *A. procera* for which the host is unknown (Warén 1981; Morton and Mladenov 1989; Simone and Martins 1995; Simone 2002**)**. According to Warén (1982; 2008) specificity in generic level can be noted for Eulimidae that usually have its hosts well documented. These associations are so well established that paleontologists use them as tool for identification of poorly preserved fossil echinoderms (Lozouet and Dockery 2001).

Based on the present results, the geographical distribution of *Annulobalcis aurisflamma*, originally restricted to São Paulo coast in Ubatuba (Simone and Martins 1995) and São Sebastião channel (L.F. Netto *unpublished dissertation*), extends to northeastern Brazil, in Salvador, Bahia State. This record implies that the species previously confined to the zoogeographical Paulista Province is now observed as far as the Tropical Province (Palácio 1980; Floeter and Soares-Gomes 1999).

FIGURE 3. Photography in situ of *Annulobalcis aurisflamma* parasiting on *Tripometra carinata carinata*.

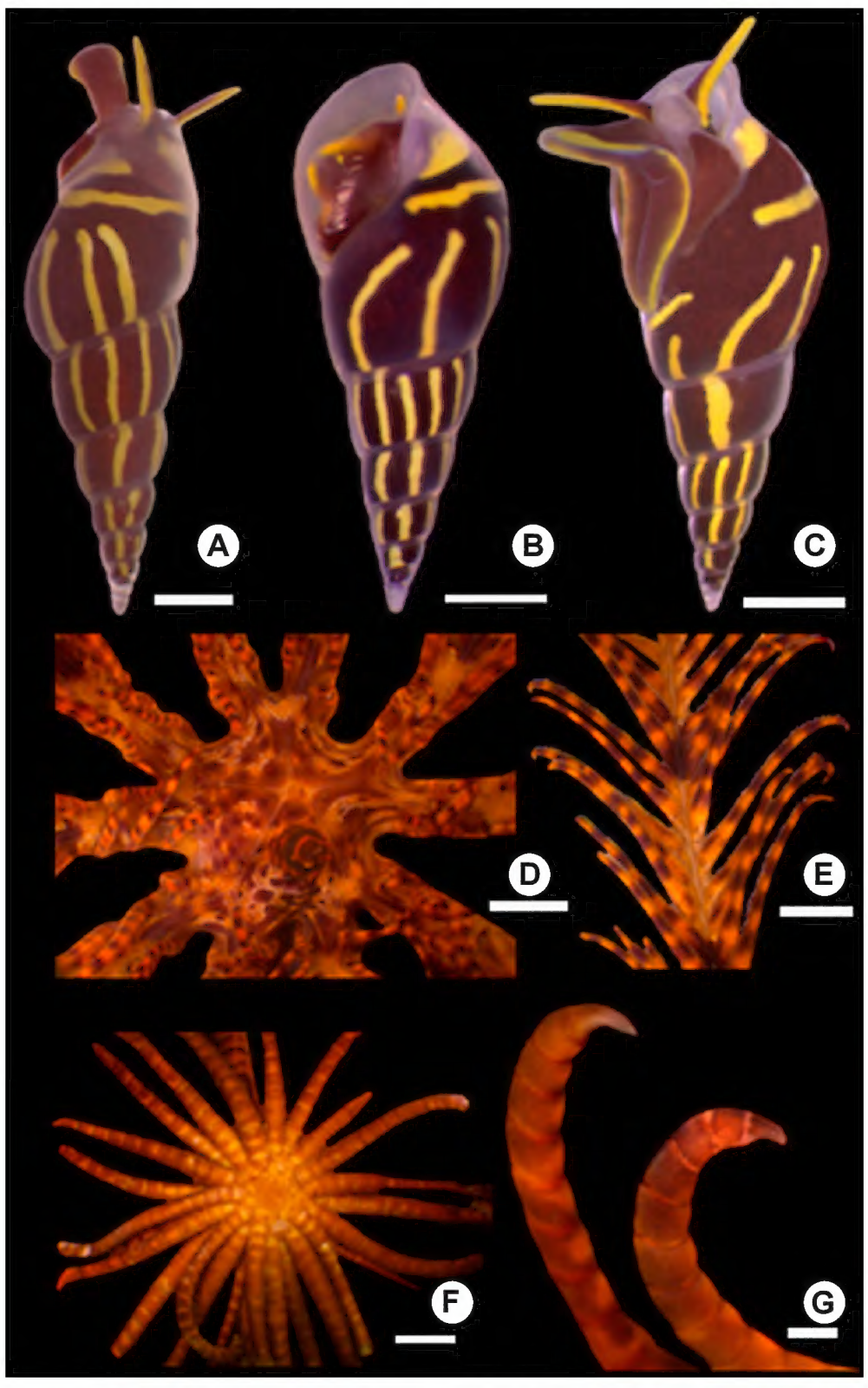

FIGURE 2. *Annulobalcis aurisflamma* (A, B and C) and its host *Tropiometra carinata carinata* (D, E, F and G): A – dorsal view. B and C – ventral view. D – Oral view of the calyx showing mouth and anus. E – Arm showing some pinnules. F – Aboral view of the calyx showing the cirrus. G – Cirrus in detail. Scale lines: A, B, C, F and G = 1 mm. D = 2 mm. E = 3mm.

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